

## CLAIMS

What is claimed is:

1. A digital gyrator, comprising:

5 a digital filter to emulate an inductance on a telephone line serviced by said digital filter, said digital filter being initially settable to a first cutoff frequency;

an oscillation checker module to detect an amplitude of oscillation on said telephone line serviced by said digital filter, said oscillation checker module adapted to reset said digital filter to a  
10 second cutoff frequency lower than said first cutoff frequency as a function of said detected oscillation level.

2. The digital gyrator according to claim 1, wherein:

15 said gyrator resets said digital filter to a third cutoff frequency after a predetermined period of time after said digital gyrator causes telephone equipment to enter an off-hook condition.

3. The digital gyrator according to claim 2, wherein:

20 said first cutoff frequency is significantly faster than said third cutoff frequency.

4. The digital gyrator according to claim 2, wherein:

said predetermined period of time is at least one second.

25 5. The digital gyrator according to claim 1, wherein:

said first cutoff frequency relates to a desired convergence rate when said telephone line is in a pre-charge state.

6. The digital gyrator according to claim 5, wherein:

30 said second cutoff frequency relates to a desired convergence rate after said telephone line is in a steady state.

7. The digital gyrator according to claim 1, wherein:  
said second cutoff frequency relates to a desired  
convergence rate after said telephone line is in a steady state.

5           8. The digital gyrator according to claim 1, further  
comprising:

          a digital load line correlation table to correlate values  
output from said digital filter into a desired voltage level.

10           9. The digital gyrator according to claim 8, further  
comprising:

          a codec to convert an output from said digital load line  
correlation table into a voltage signal for output to a DAA servicing said  
telephone line.

15           10. A method of regulating a signal on a telephone line,  
comprising:

          digitizing a signal received from said telephone line;

          filtering said digitized signal with a digital low pass filter

20   having a first cutoff frequency;

          detecting an amplitude of oscillation in said signal at said  
telephone line; and

          adjusting said digital low pass filter to have a second  
cutoff frequency lower than said first cutoff frequency to dampen said  
25   detected oscillation if an amplitude of said oscillation indicates an  
unstable pre-charge state of said telephone line.

11. The method of regulating a signal on said telephone line according to claim 10, further comprising:

after a pre-charge period of said telephone line, adjusting said digital low pass filter to have a third cutoff frequency relating to a steady state of said telephone line.

12. The method of regulating a signal on said telephone line according to claim 10, wherein:

said first cutoff frequency is approximately 1 Hz.

13. The method of regulating a signal on said telephone line according to claim 12, wherein:

said second cutoff frequency is approximately 0.1 Hz.

14. The method of regulating a signal on said telephone line according to claim 10, wherein:

said second cutoff frequency is approximately 0.1 Hz.

15. Apparatus for regulating a signal on a telephone line, comprising:

means for digitizing a signal received from said telephone line;

means for filtering said digitized signal with a digital low pass filter having a first cutoff frequency;

means for detecting an amplitude of oscillation in said signal on said telephone line; and

means for adjusting said digital low pass filter to have a second cutoff frequency lower than said first cutoff frequency to dampen said detected oscillation if an amplitude of said oscillation indicates an unstable pre-charge state of said telephone line.

16. The apparatus for regulating a signal on said telephone line according to claim 15, further comprising:

means for adjusting said digital low pass filter after a pre-charge period of said telephone line, to have a third cutoff frequency  
5 relating to a steady state of said telephone line.

17. The apparatus for regulating a signal on said telephone line according to claim 15, wherein:

said first cutoff frequency is approximately 1 Hz.

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18. The apparatus for regulating a signal on said telephone line according to claim 17, wherein:

said second cutoff frequency is approximately 0.1 Hz.

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19. The apparatus for regulating a signal on said telephone line according to claim 15, wherein:

said second cutoff frequency is approximately 0.1 Hz.